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UNITED STATES DEPARTMENT OF AGRICULTURE
BULLETIN No. 425
Office of the Secretary
Contribution from the Office of Farm Management
W. J. SPILLMAN, Chief

Washington, D. C. October 24, 1916

FARMING ON THE CUT-OVER LANDS OF MICHIGAN, WISCONSIN, AND MINNESOTA.

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The cut-over district of northern Michigan, Wisconsin, and Minnesota comprises an area of about 30,000,000 acres which is rapidly being developed into farms. This bulletin is based on data secured from an analysis of a year's business on 801 farms typical of this area, an investigation of farm enterprises on 80 of these farms, and a general study of farm practice in various parts of the district covering a period of several years. The purpose of these investigations was to discover the more profitable farm practices and the factors essential in the development of the region.

SUMMARY.

1. In this district net profits increase as tillable area increases. How to enlarge the tillable area economically is the first and most important agricultural problem of this region. Under present conditions the clearing of land is expensive, usually costing from $20 to $60 an acre.

2. A large acreage of unimproved land is likely to prove an unprofitable investment unless it can be utilized for wood products or pasture. If, however, its development into tillable land is possible,

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Note.—This bulletin is issued to meet the demand for a publication dealing in a popular manner with the essential problems of this region.

it offers an opportunity to expand the farm business to the full capacity of the total farm area.

3. Labor incomes average $118 on the 355 farms that have crop yields above the average, and minus $5 on the 446 farms that have crop yields below the average, a difference of $123.

4. With average yield and average price, potatoes furnish a satisfactory cash crop in practically all parts of the district. Large acreage, however, is not to be generally recommended on account of the danger of low prices resulting from local overproduction.

5. Other valuable cash crops adapted to certain areas are hay, clover seed, peas, beans, hairy vetch, potatoes, seed corn, oats, rye, wheat, barley, small fruit, and garden vegetables.

6. Early varieties of corn mature in the southern and central part, and silage corn can usually be produced over a large portion of the district.

7. Silos are increasing rapidly wherever corn can be grown. When only a few cows are kept, root crops are generally substituted for silage.

8. As there are few large cities, the demand for truck crops is somewhat limited in most parts of the district. The well-managed farms produce an abundance of home supplies, such as vegetables, small fruit, milk, butter, eggs, and meat.

9. Dairying combined with cash crops is financially profitable when production per cow is high and crop yields above the average.

10. On dairy farms of all sizes the quality of cows, as indicated by receipts per cow, is a major factor in determining labor income.

11. The production of sheep or beef cattle as a major enterprise, while not common in the district, is furnishing satisfactory incomes on a few farms.

12. Hog production may be profitably combined with dairying where corn matures and on farms where rye, barley, soy beans, or Canadian field peas can be substituted for corn.

13. On account of the opportunity to use extra labor to advantage at all seasons of the year, either in lumbering or in clearing land, seasonal distribution of farm labor has not yet become an important problem in recently settled sections.

14. A large amount of family labor is available, much of which is not used to advantage.

15. The crop area per horse is too small for the most profitable use of labor.

16. Small irregular fields and numerous stumps prevent the most efficient use of farm machinery.

17. Few farmers in this district are rapidly accumulating wealth, but, with economy and good management, there is an opportunity to make a living and a little more.

DESCRIPTION OF THE AREA.

The cut-over district in the northern part of Michigan, Wisconsin, and Minnesota extends in a broad belt from St. Marys River and Lake Huron on the east to the Red River Valley on the west. The shaded portion of the map (fig. 1) shows in a general way the boundaries of this district.

The high price of lumber in recent years has brought about the destruction of most of the pine forests in this region and has caused big inroads to be made into the forests of hardwood. Fires have also played an important part in the destruction of these northern forests. The harvesting of the crop of timber and its manufacture into lumber has made a few men very wealthy and for a long time has furnished employment to a large force of laborers at reasonably good wages.

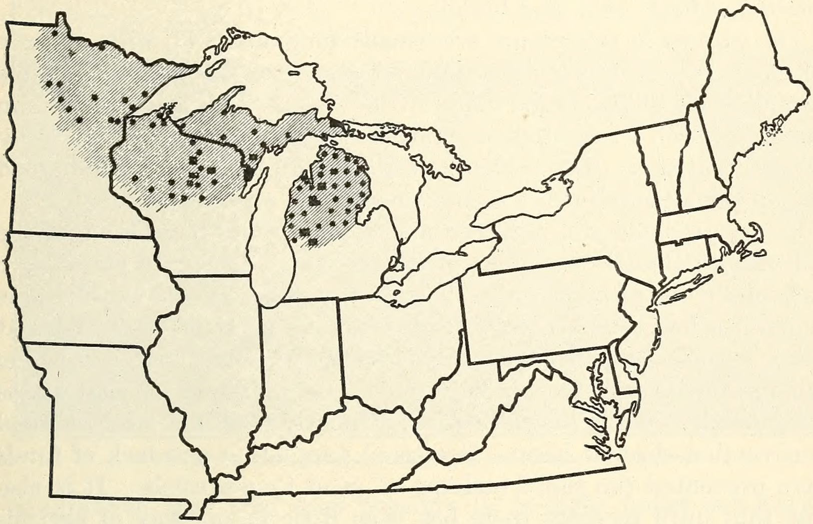

FIG. 1.—Map showing cut-over district (shaded area) and location of farms studied. Squares show areas where farm surveys were made and round dots areas where farm practice studies were conducted.

Strange as it may seem, the lumberman rated the land that produced this heavy growth of timber as having little or no agricultural value. While this may be true of some of the swamp land and sandy belt areas, it is by no means generally true of this extensive cut-over district. At present prices for farm products the very sandy lands can not be farmed successfully by the ordinary methods now in use and the swamp lands must be drained before they can add to farm profits, but a large percentage of both these soil types can and will eventually be brought under successful cultivation.

The soils of this region are largely of glacial origin, as the ice sheet at one time covered the entire district. There are large areas of swamp lands, especially in northern Minnesota and the northern peninsula of Michigan. Much of the swamp land is productive when drained and generally the cost of drainage is not excessive. As is common in most glacial districts, the soils range from light sand to very heavy clay. There is a small percentage of worthless sandy land that the prospective settler would do well to avoid, and there are larger areas of light sandy soils that can not produce large crops without fertilizers. Sandy loam and medium loam soils predominate and these when properly managed produce satisfactory yields of all crops adapted to the district. Such crops as clover, beans, peas, rye, vetch, buckwheat, corn, potatoes, root crops, and small fruits do well on the sandy loam soils. These crops also do well on the heavier soils, and in addition these richer soils produce satisfactory crops of timothy, wheat, oats, and barley.

The winters in this region are usually long and cold, with a heavy fall of snow. Ordinarily the summers are short and hot, with ample rainfall, well distributed. Late frosts in spring and early autumn frosts limit the kinds of crops that can be grown, yet early varieties of corn mature in the southern portion of this belt and make good silage over a large portion of this area in the average year.

Forest products and rich iron and copper mines have brought the railroads to almost every part of the region. These enterprises have also caused the growth in this district of many towns of considerable size and a few comparatively large cities. The railroads and Great Lakes furnish excellent shipping facilities for agricultural products and the towns and cities furnish good local markets. Wagon roads are generally poor, though there is ordinarily good material for road construction close at hand. Scattered population and lack of funds have prevented the rapid building of good wagon roads. It is also true that until recently there has been little in the way of agricultural products to be hauled over the roads, consequently there was small demand for road improvement. Considering the undeveloped condition of the country, school advantages generally are very good.

The cut-over district is exceptionally well watered. Many small streams and lakes are distributed over the region. (See fig. 2.) Nearly everywhere wells of moderate depth furnish an adequate supply of first-class water.

TYPE OF FARMING.

In most parts of the cut-over district definite types of farming have not yet become established. Over a large part of this area conditions are especially favorable for the development of dairying. The relatively large acreage and high yields of hay, together with fair yields of silage corn over much of this section indicate a promising future for the dairy type of farming. The survey records indicate that dairying and hog production, combined with a moderate acreage of one or two money crops, is proving a satisfactory type of farming on a large percentage of the farms of this region. Mixed farming rather than a highly specialized type is apparently well adapted to the majority of farms in this district.

Table 1 shows the average area, capital invested, and income[1] of 801 farms in the cut-over district. The average size of these farms is 108 acres, of which 55.2 acres, or practically one-half, are tillable and 52.8 acres are nontillable. In addition to all the unimproved land that may possibly be brought under cultivation, the term "nontillable area" as used here includes the nonproductive lands taken up by farmsteads, roads, streams, timberland, etc.

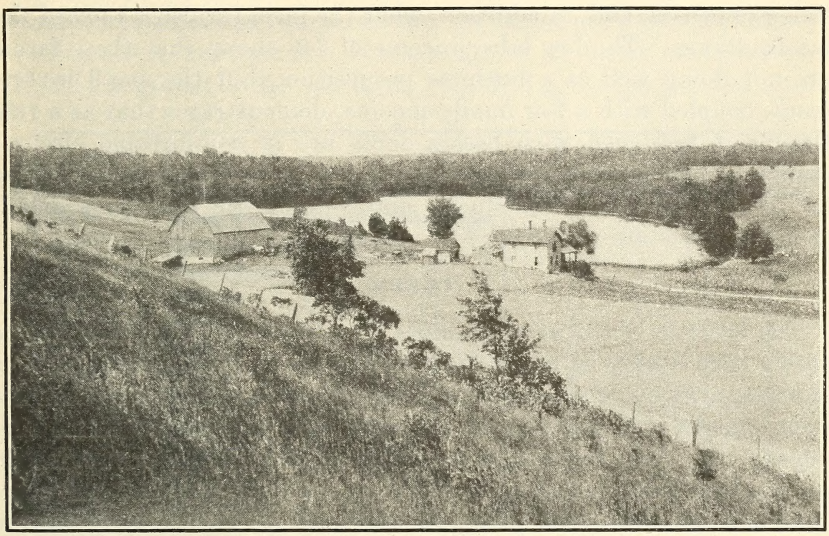

FIG. 2.—In some parts of the region lakes and streams are numerous.

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[1] The following definitions may be found helpful in studying the tables:

a. Family labor is the unpaid farm labor furnished by the family, not including the operator's labor.

b. Labor income is the amount left the farmer for his services after all expenses, except the value of his labor, have been deducted. Family labor, depreciation, and interest on total investment, are included among these expenses. In addition to labor income, the farmer has his home and what the farm furnishes directly toward the family living.

In this bulletin interest is figured at 5 per cent.

c. Farm income is total receipts minus all expenses except the value of the operator's labor and interest on total investment; or, farm income is labor income plus interest on total investment.

d. Family labor income is total income minus all expenses except the value of the operator's labor and family labor; or, family labor income is labor income plus value of family labor.

e. Family income is total income minus all expenses except the value of the operator's labor, family labor, and interest on total investment; or, family income is labor income plus value of family labor, plus interest on total investment.

TABLE 1.—*Area, capital invested, and income per farm.*

[Average of 801 farms.]

Tillable area	acres..	55.2
Nontillable area	do....	52.8
Size of farm	do....	108
Capital invested		$6,856
Family income		$559
Family labor income		$217
Farm income		$391
Labor income		$49

The average investment per farm is $6,856, and the family income $559. Thus, if free of debt, the average family has a home, $559 for living expenses, and, in addition, what the farm furnishes toward the family living. The low labor income of $49 shows that these farms are not doing well as a business proposition, but the small investment, coupled with a fair family income, demonstrates that as a rule those not burdened with heavy debts are in comfortable circumstances. A large percentage of the settlers are foreign born. They are industrious and economical, and while their income is small, their expenses are relatively low.

CROPS.

The latitude of this section limits the number of crops that can be grown successfully as major farm enterprises. From the standpoint of acreage, hay is of greatest relative importance. This crop occupies approximately 40 per cent of the total crop area of the farms surveyed. On these farms oats is second in importance, occupying 20 per cent of the total crop area. Corn occupies but 14.6 per cent. This acreage will undoubtedly be increased as earlier varieties are developed. The State experiment stations and local substations are doing splendid work along this line. A good proportion of the present acreage of corn is grown for silage. Potatoes occupy about 9 per cent of the total crop area, which places this crop next below corn from the standpoint of acreage. There are a number of other crops grown but these are of minor importance. Table 2 shows the average acreage of the different crops on the 801 farms surveyed. Figure 3 shows the relative importance of the acreage in each of these crops.

TABLE 2.—*Percentage of crop area devoted to each crop.*

[Average of 801 farms.]

Crop.	Acres.	Per cent.	Crop.	Acres.	Per cent.
Corn	7.0	14.6	Peas	0.6	1.2
Potatoes	4.3	8.9	Beans	1.1	2.3
Wheat	1.5	3.2	Roots	.1	.2
Rye	2.1	4.4	Fruit	1.2	2.5
Oats	9.7	20.2	Truck	.2	.4
Barley	.5	1.0			
Buckwheat	.6	1.2	Total	48.1	100.0
Hay	19.2	39.9			

These results should not be taken to mean that the present acreages of crops represent an ideal cropping system for this region. While all these crops are commonly grown in this section there is probably no one farm that ever produces all of them. While hay and potatoes are two of the leading money crops, these crops are not grown extensively on every farm. Of these crops hay covers the largest acreage, but the selling of this crop is by no means a universal practice.

LIVE STOCK.

While some live stock is kept on nearly every farm, this industry has not reached its full state of development in the region as a whole. Aside from dairying, comparatively few farms are devoted exclusively to live-stock enterprises. The average of all farms surveyed shows about 14 animal units[1] per farm. Table 3 gives the average number of animal units per farm and the percentage of each class. Figure 4 shows the relative importance of each class of live stock.

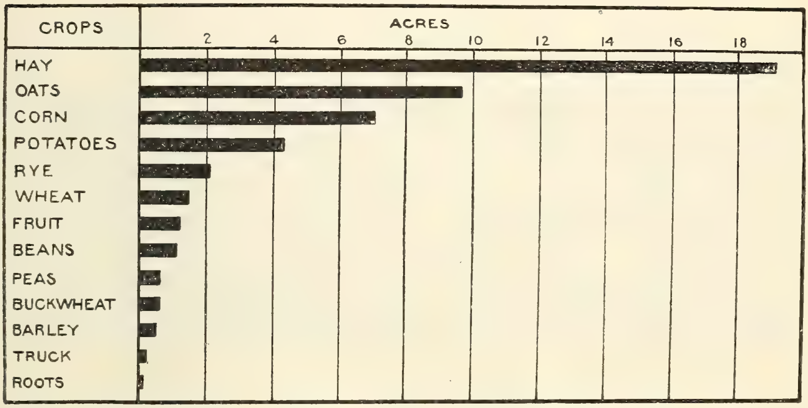

FIG. 3.—Acres of crops per farm. (Average of 801 farms in northern Michigan, Wisconsin, and Minnesota.)

TABLE 3.—*Number and percentage of animal units of each class.*

[Average of 801 farms.]

Kind of animal.	Animal units.		Kind of animal.	Animal units.	
	Number.	Per cent.		Number.	Per cent.
Dairy cows	5.8	41.1	Sheep	0.3	2.1
Young cattle	2.9	20.6	Hogs	.8	5.8
Bulls	.3	2.1	Poultry	.5	3.6
Steers	.6	4.2			
Work horses	2.7	19.1	Total	14.1	100.0
Colts	.2	1.4			

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[1] An "animal unit" is the equivalent, from the standpoint of feed required, of a full-grown cow or horse. It is customary to count as an animal unit 2 head of young cattle or colts, 5 hogs, 10 pigs, 7 sheep, 14 lambs, or 100 poultry.

As shown in Table 3, cows represent 41 per cent of the total number of animal units, and together with young stock and bulls, comprise over 63 per cent of all the live stock. This gives some idea of the extent of dairying in the district as compared with other live-stock enterprises.

The sheep business and beef-cattle industry, though relatively unimportant, are financially successful when well managed. To be highly successful these industries require considerable capital and a thorough knowledge of the business. In both types of farming labor costs are relatively low. On the farms tabulated, steers constituted 4.2 per cent of the total animal units and sheep 2.1 per cent. A study was also made of a few selected typical sheep and beef-cattle farms. These farms had the advantage of large acreage and considerable capital. The labor incomes were very good. The average farmer in this district has not sufficient capital to buy enough animals or to control enough suitable land for beef cattle or sheep farming. Unless he can furnish winter feed he is compelled, regardless of price, to buy his live stock in the spring and sell in the fall. This tends to make the business speculative for the man of moderate means. Briefly stated, the requirements for success in the production of beef and mutton on a large scale in this territory are plenty of feed and water, sufficient capital, and a knowledge of how and when to buy and sell.

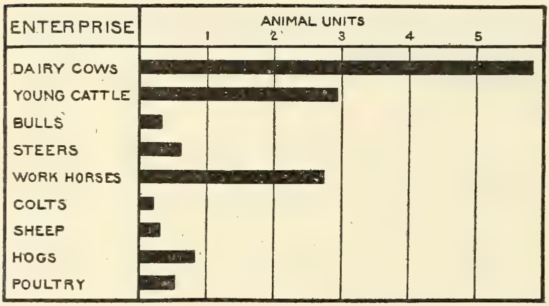

FIG. 4.—Animal units per farm. (Average of 801 farms in norhtern Michigan, Wisconsin, and Minnesota.)

Though there are not many exclusively sheep or beef-cattle farms in the district, it is not unusual to find such animals kept in small numbers at a profit. They help to utilize unimproved land. The sheep, especially, are of considerable importance in connection with the clearing of new land. (See fig. 5.) On the average farm in the cut-over district both these enterprises are at present very much limited through lack of winter feed.

The crops that can be grown successfully in this district are well adapted to the production of hogs of the bacon type. At present hogs constitute only 5.8 per cent of the animal units on each farm, but as larger acreages of corn, rye, barley, clover, alfalfa, soy beans, and Canadian field peas are grown more hogs can be produced at a profit. A good practice is to pasture hogs all summer on clover or alfalfa, then fatten them on corn, rye, or barley. The climate and the heavier soils are especially adapted to the production of barley.

Some poultry is kept on practically every farm, but there are few large poultry farms in the district. A small flock is maintained at little expense and furnishes eggs and meat for the family.

There are 2.7 work horses per farm, an average tillable area of 55.2 acres, and an average crop area of 49 acres. This is less than 21 tillable acres and about 18 crop acres per horse. The horses could cultivate more land profitably. At present, however, they are used in clearing and in breaking new land, and during the winter months they are frequently employed in the lumber woods.

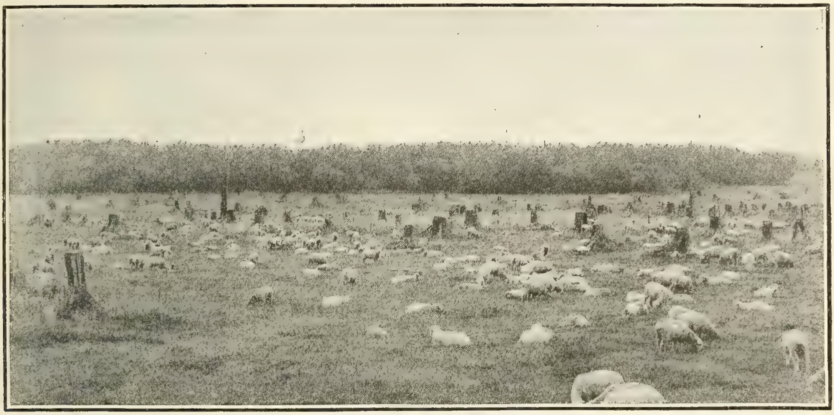

FIG. 5.—In some sections sheep are valuable in utilizing pasture and for destroying second-growth sprouts.

RELATION BETWEEN INCOME AND TILLABLE AREA.

That there is a definite relation in this district between income and acreage under cultivation is clearly shown in Table 4.

TABLE 4.—*Income as affected by tillable area.*

[Average of 801 farms.]

Tillable area per farm.	Farms in group.	Tillable area.	Size of farm.	Capital.	Family income.	Family labor income.	Farm income.	Labor income.
		Acres.	*Acres.*					
20 acres or less	50	15.5	60	$3,593	$213	$33	$62	—$118
20.1 to 40 acres	246	31.6	77	5,011	339	89	194	— 56
40.1 to 60 acres	237	50.2	107	6,620	533	203	377	47
60.1 to 80 acres	151	68.8	124	7,707	622	237	437	52
80.1 to 100 acres	54	88.9	148	9,488	939	467	667	195
100.1 to 140 acres	43	115.1	169	11,099	1,179	626	1,016	463
Over 140 acres	20	179.5	254	17,872	1,586	693	1,388	495
Total and average of all farms	801	55.2	108	6,856	559	217	391	49

In this table the farms are classified on the basis of tillable area. In a region like this, having a very large percentage of unimproved land, it is better to measure size of business in tillable area than in total area. Family income, family labor income, farm income, and labor income are also shown in the table. These incomes increase in direct ratio to the increase in tillable area. The 50 farms in the first group with an average tillable area of 15.5 acres have an average labor income of minus $118 and an average family income of $213. These incomes constantly increase with each group until in the last, with an average tillable area of 179.5 acres, the average labor income is $495 and the average family income $1,586.

The average amount of capital invested in the first group is $3,593 and in the last group $17,872. The average total investment for the 801 farms is $6,856. As compared with some areas studied in other parts of the country, the average incomes are not large, but it must be remembered that the average investment is small. These figures show what is being done with small capital and small clearings, and indicate what may be done with more capital and with larger acreage under cultivation.

SIZE OF FARM.

All these groups, except possibly the last, contain enough farms to warrant the drawing of definite conclusions as to the relation existing between income and size of business as measured by tillable area. The "little farm well tilled" may succeed, and frequently does succeed in this area, but the prospects are brighter for the larger farm if that larger farm has sufficient area under cultivation. Among the records there are those of quite a number of farms having satisfactory labor incomes on less than 40 acres of cleared land, but these farms have rich soil, exceptionally good livestock, and, as a rule, a considerable acreage of woods pasture. A family engaged in general farming may make a fair living on a farm with 40 acres under cultivation and should be able to make money with 80 to 160 acres under cultivation. The rapid enlargement of the cultivated area on each farm, when it can be done economically, is the first and most important agricultural problem in this district and the one that has the widest and most general application.

How large the farm should be in this region will depend much on the farmer's resources. The average farm in the third group with 50.2 tillable acres produces a family income of $533. If the farm is free of debt, all of this money is available for the family living, but if family labor and interest are deducted, the farmer has only $47 left to pay him for his year's work. The next group of farms, with an average of 68.8 acres under cultivation, gives results only a little better. The following group, having a tillable area between

80.1 and 100 acres, with an average of 88.9 acres, gives much better results. In this group the farmer receives $195 a year for his labor, and the farmer and his family receive $467 a year for their labor. If free of debt, they have a family income of $939 on which to live. While there are individual farms of all sizes that are financially successful, this is the first group of farms in the series that has large enough area under cultivation to produce satisfactory average incomes. The next group with greater tillable area shows larger net returns, and the last group has an average tillable area of 179.5 acres, a labor income of $495 and a family income of $1,586. These would be considered very satisfactory incomes for any agricultural section of the country. None of the farms studied in this district was too large in tillable acres. Briefly stated, the figures show that for the northern cut-over district a farm with 50 acres of rich land under cultivation usually produces a good living for a family of average size, and that 90 acres of rich land under cultivation is a fair foundation for business success.

Figure 6 shows in graphic form the data given in Table 2.

The curves show that the incomes advance about in proportion to the increase of tillable area, except that the incomes advance very slowly as the cultivated area is increased from 50 to 70 acres. The slow gain in income at that stage is doubtless due to the fact that there is a transition period between the small farm and the large farm where labor and equipment are used less efficiently than on farms that are either below or above that size.

UNIMPROVED LAND.

Some of the more important problems of the cut-over district are in connection with the utilization and development of the unimproved farm area. Table 1 shows that the average size of farm in the district is 108 acres and that approximately one-half this area is tillable and about one-half is nontillable. Table 4 shows that the group of farms having less than 40 acres tillable made minus labor incomes and only the groups having 80 acres or more of tillable land made a labor income above $100. This table further shows that in the first group the average farm area is only 60 acres, about one-half of which is tillable. The second group has an average farm area of 77 acres with less than one-half tillable. Both these groups made minus labor incomes. These figures bring out the fact that more of the unimproved farm area should be brought under cultivation. Indeed this is the most logical way of increasing the farm business since it not only increases the earning capacity of the farm but at the same time cuts down the burden of unimproved land the farm must carry.

After deducting from 5 to 10 per cent of the farm area for land taken up by woodland, building lots, roads, and streams, practically 20 per cent of the farm area in the first group of farms is unimproved. The percentage of unimproved land gradually increases throughout the different groups to practically 60 per cent in the last two groups. The chief expense of carrying this unimproved land consists of taxes and interest. In figuring profits from a business standpoint, interest on the investment in land must be considered.

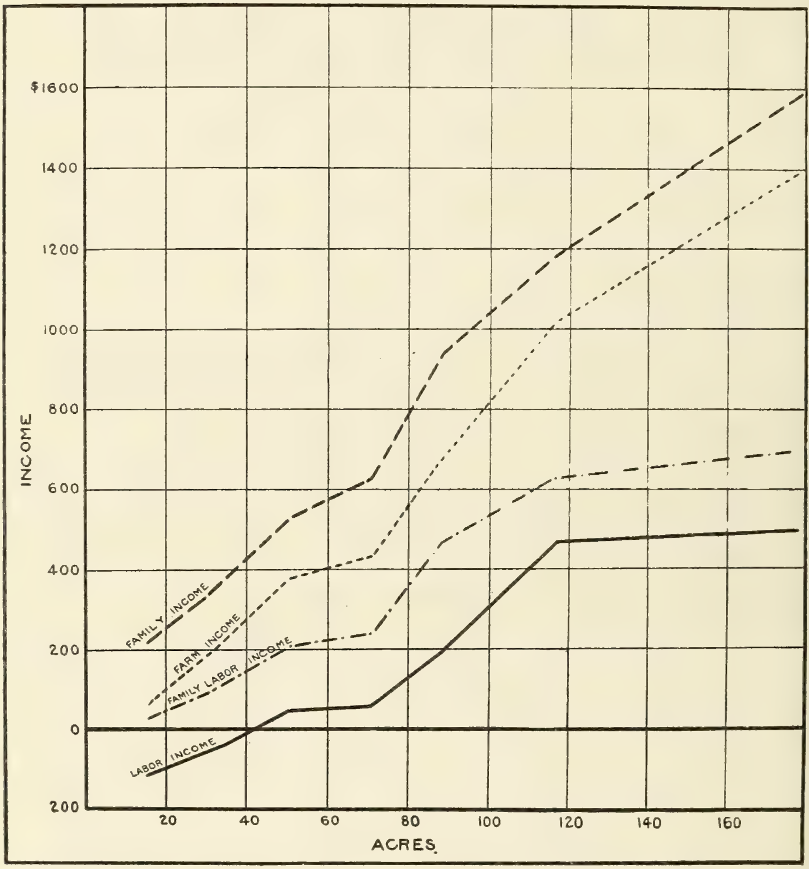

FIG. 6.—Relation of tillable area to income. (Average of 801 farms in northern Michigan, Wisconsin, and Minnesota.)

The wisdom of owning a large acreage of unimproved land depends largely on the prospect of future advance in price of land and the rapidity with which such land can be developed. Wherever possible unimproved land should be made to yield some returns. On many of these farms some income can be derived from the sale of lumber, wood, and fence posts. In this way these lands furnish profitable employment during the winter season. As fast as possible unimproved land should be put into condition to grow grass and should be used as pasture for live stock.

LAND CLEARING.[1]

A large part of the nontillable land in this district is covered with large stumps. Clearing is difficult and requires much heavy work and considerable capital. In order to develop this country rapidly, more farmers with capital are needed. To the settler with small capital the clearing of land will necessarily be slow but not impossible. Ordinarily the cost of clearing land ranges from $20 to $60 per acre, depending mainly on the kind, condition, number, and size of stumps; the acreage to be cleared; the amount of wood and brush that must be removed or burned; and the quality and condition of the soil. A part of this cost may frequently be offset through the sale of wood products. Small stumps when numerous are most economically removed by means of stump pullers, and larger ones by the use of dynamite or a combination of the two methods. Ordinarily the cost of removing stumps ranges from 20 to 75 cents per stump. Stumps of all kinds are much more easily removed if considerable time has elapsed since the timber was cut. (See fig. 7.)

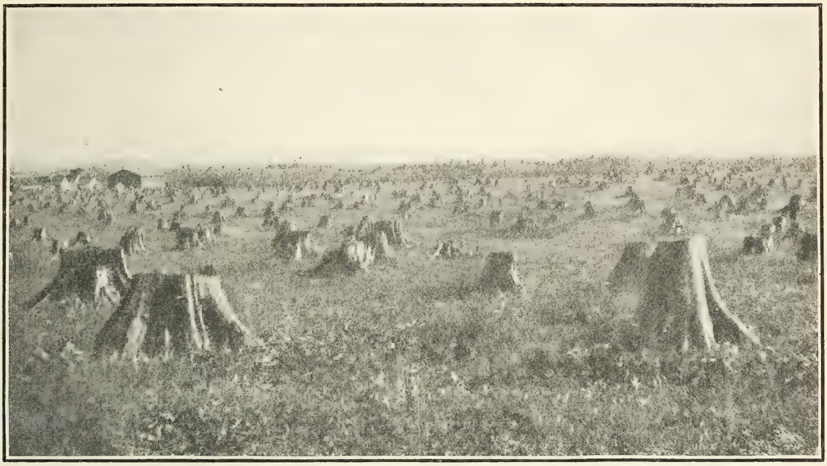

FIG. 7.—A stump-land pasture. Seeding the land to grass and pasturing for several years lessens the cost of clearing.

Most varieties of hardwood stumps decay in a short time, but white and Norway pine stumps remain comparatively sound for many years. For this reason hardwood lands, other things being equal, are more in demand. It is important in all cases to make sure that the quality of land justifies the expense of clearing.

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[1] For detailed information concerning land clearing see the following bulletins: U. S. Department of Agriculture Bulletin No. 91, entitled "Cost and Methods of Clearing Land in the Lake States;" Minnesota Experiment Station Bulletin No. 134, entitled "Land Clearing;" and Wisconsin Experiment Station Bulletin No. 216, entitled "Use of Explosives in Clearing Land."

FAMILY INCOME.

From the standpoint of economic well-being the family income is the item of greatest importance in the operation of the farms in the cut-over district. In computing labor income the value of the family labor is properly considered an expense and is charged against the farm, but labor income is merely a measure of the success of the business management of the farm, while family income is the real measure of the resources available each year to meet all obligations. If the farm is free of debt, the entire family income is available to the farmer and his family to meet the expense of living and to get ahead. In addition they have a home and what the farm furnishes toward the family living. Table 5 classifies these farms on the basis of family income.

TABLE 5.—*Farms classified on basis of family income.*

[Average of 801 farms.]

	Less than 0.	0 to $300.	$301 to $500.	$501 to $1,000.	$1,001 or more.
Family income	–$140	$162	$397	$710	$1,457
Number of farms	46	216	183	231	125
Percentage of farms	6	26	23	29	16

This table shows that only 6 per cent of the farms failed to make incomes above farm expenses. A study of the records of the farms with minus family incomes gave evidence that at least some of these families have small incomes from outside sources. Of the 801 farms, 16 per cent produced a family income above $1,000; 29 per cent, $501 to $1,000; and 23 per cent, from $301 to $500.

LABOR INCOME.

For the year 1914, 3 per cent of the farms surveyed made an average labor income of $1,450, 9 per cent $700, 11 per cent $398, and 28 per cent $134. The following table shows that 51 per cent of the 801 farms studied made plus labor incomes.

TABLE 6.—*Farms classified on basis of labor income.*

[Average of 801 farms.]

	Less than 0.	0 to $300.	$301 to $500.	$501 to $1,000.	$1,001 or more.
Labor income	–$280	$134	$398	$700	$1,450
Number of farms	395	222	88	72	24
Percentage of farms	49	28	11	9	3

These figures were secured for the crop year 1914. The year was somewhat abnormal in the small price received for potatoes, and in some of the areas studied the yield of oats was quite low because of rust. To offset this the corn and hay crops were generally good, the hay crop being exceptionally good in some parts of the district. A limited number of records taken for the years 1913 and 1915 indicate that these labor incomes are only slightly below normal.

From a strictly business point of view these farms do not appear to be successful, but they furnish a home for the family and offer an opportunity to earn a living. The owners, however, should not be satisfied with their present conditions, and indeed most of them are not.

QUALITY OF COWS AND LABOR INCOME.

The influence of quality of cows on labor income can be satisfactorily studied only on farms on which dairying is a leading enterprise. For this reason Table 7 includes only farms that have 40 per cent or more of the gross income from the sale of dairy products.

TABLE 7.—*Income on dairy farms as affected by quality of cows.*[1]

[Average of 164 farms.]

Group and tillable area.	Income per cow.	Number of farms.	Number of cows per farm.	Average tillable area.	Income per cow.	Family income.	Family labor income.	Farm income.	Labor income.
				Acres.					
Group A, less than 40 acres.	Less than $50.	34	6.2	26.4	$33.7	$183.0	−$71.9	−$9.9	−$264.8
	$50 or more.	26	7.2	28.7	65.5	504.3	204.8	330.1	30.6
Group B, 40 to 80 acres.	Less than $50.	34	9.7	53.5	36.5	315.7	− 34.4	81.4	− 268.7
	$50 or more.	56	9.8	57.1	72.0	771.2	346.8	546.5	122.1
Group C, 80 acres or more.	Less than $50.	None.	....	....	....	....	....	....	....
	$50 or more.	14	18.4	124.8	86.1	1,487.8	668.0	1,095.8	276.0

In order to eliminate the influence of size of business, the farms are first grouped according to tillable area. Each group is then subdivided on the basis of income per cow. In each group the first subdivision includes all farms having less than $50 income per cow, and the second subdivision includes all farms on which the income per cow is $50 or more.

Group A contains farms having a cultivated area not to exceed 40 acres. In this group the farms having poor cows have practically the same number of cows and the same acreage under cultivation as the farms having the better grade of cows. This eliminates size of business as measured in number of cows and tillable area. In a similar way the influence of size of business is minimized in groups B and C.

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[1] As the term is used in this bulletin, a dairy farm is one that derives at least 40 per cent of its receipts from the sale of dairy products and not that much from any other one enterprise.

In group A the average family income on the 26 farms having the better class of cows is $504, or almost three times the average family income of the other 34 farms. Undoubtedly the farmers who kept the higher quality of cows were also better farmers than the average in other respects, yet it is fair to conclude that as dairying is a major enterprise on each of these farms the quality of the cows has much to do with producing the larger incomes.

In group B the 56 farms having the better cows have an average family income of $771, or about two and one-half times that of the 34 farms having the less productive cows. As compared with group A, a much larger percentage of the farms in this group have the better grade of cows. The ability of these farmers to eliminate the less productive cows is largely due to better financial circumstances. The larger average cultivated area as compared with group A indicates that these are generally better developed farms than those in group A. The selection of cows has, therefore, in most cases probably covered a longer period.

Group C contains no farms on which the average income per cow is less than $50. As compared with the farms having the better grade of cows in group B, the farms in group C are more than twice as large in cultivated acres, have about twice the number of cows, larger receipts per cow, almost twice the family income, and more than twice the labor income per farm. These increased incomes are therefore apparently due to a combination of three major factors: Tillable area, number of cows, and quality of cows. In groups A and B, however, all these major factors are eliminated, except quality of cows, and the larger incomes may be attributed very largely to the influence of quality alone.

The average value of cows on the 801 farms included in the survey is $57.11, and the average value of milk products per cow is $58.04. This estimate of milk products includes what the dairy furnishes the family as well as milk products sold. Such a low return yields little if any profit. With so small an area under cultivation as is found on most farms in this district, crops should be fed to better cows.

The need of more and better cows is generally recognized by farmers and business men in all parts of the district. Many of the farmers are recent settlers and not well supplied with working capital; it is therefore not an easy matter for them to pay for first-class cows. Knowing that successful agriculture is necessary to the permanent prosperity of nearly all lines of business in this district, the city business men in some sections are helping the farmers to raise money with which to purchase good dairy stock. The necessary capital is obtained from the banks, and security is guaranteed by the business men who in turn take their security on the stock purchased. Principal and a moderate rate of interest are paid monthly out of the receipts from the sale of dairy products. This plan, known from its place of origin as the "Ashland Plan," is attended with some risk to those who guarantee the loans, but in most instances it appears to have met with considerable success. When well managed, it has helped materially to improve the quality of the dairy cattle.

As the country develops, more money will become available for the improvement of dairy herds. This improvement could be greatly hastened now at moderate expense by securing better bulls. Some owners of dairy farms in this district keep first-class cows. These men are making money. On a few such farms the herd bulls are of excellent quality and breeding. For this district probably the next most important problem after increasing tillable area is the securing of more and better cows. (See fig. 8.)

FIG. 8.—Dairy herd on pasture in cut-over district.

INFLUENCE OF CROP YIELDS ON LABOR INCOME.

Table 8 shows the relation existing between crop yields and incomes. The family income is $193 higher, and the labor income $123 higher on the 355 farms that have crop yields above the average than on the other 446 farms.

TABLE 8.—*Income as affected by crop yields.*

[Average of 801 farms.]

Range of crop yields (per cent).[1]	Number of farms.	Average crop yields.	Farm area.	Crop area.	Family income.	Family labor income.	Farm income.	Labor income.
		Per cent.	*Acres.*	*Acres.*				
Above 100	355	119	107.8	49.30	$666	$292	$491	$118
100 or less	446	83	107.6	48.77	473	156	312	−5
Difference		36	.2	.53	193	136	179	123

[1] Average yields of all farms taken as 100 per cent.

There appears to be no relation between crop yields and crop area, as crop area is practically the same for each group. The larger yields were not due to commercial fertilizers, as practically none are used in this district.

These yields were doubtless brought about in large part through richer soil, more carefully selected seed, and better cultural methods. Whatever the cause, the fact is evident that large crop yields greatly increase the farmer's income. (See fig. 9.)

CROPPING SYSTEMS AND ROTATIONS.

In the more recently settled sections of the cut-over district the cropping systems vary greatly. On the newer farms there is often no definite crop rotation, but quite definite rotations well adapted to the district are common on the more successful of the older farms.

FIG. 9.—Good crop yields are generally maintained on well-developed live-stock farms.

The most desirable as well as the most common rotation of this district consists largely of grain, legumes, and intertilled crops. These crops are usually grown in a three or a four year rotation, as follows:

	Three-year rotation.	Four-year rotation.
First year	Grain	Grain.
Second year	Hay	Hay.
Third year	Intertilled crops	Hay or pasture.
Fourth year		Intertilled crops.

In case of an abundance of pasture on undeveloped land, the three-year rotation is in general use.

With either of these rotations as a foundation, opportunity is offered for considerable variation in the choice of crops. For example, the small-grain crop may consist of oats, wheat, rye, or barley; the hay crop usually consists of clover and timothy; and the intertilled crop may include corn, potatoes, and the various root crops. Among the many other crops that are successfully grown, the following may be mentioned: Alfalfa, sweet clover, oats and peas, peas, beans, soy beans, hairy vetch, buckwheat, and millet.[1]

POTATOES.

Potatoes are a leading money crop on many farms, and practically every farm in the district produces enough for home use. They do exceptionally well when planted on a fertile loam. They do not ordinarily yield so well on compact clay or light sand, but potatoes grown on sandy soils are generally of excellent quality.

The cost of raising potatoes in this district is comparatively low, as commercial fertilizers are seldom used. Yields are greatly increased by the use of barnyard manure. The application of 10 tons of barnyard manure per acre often doubles the yield. Potato growing combines well with dairying and furnishes an excellent opportunity to turn the manure of the dairy herd into a direct profit. (See fig. 10.)

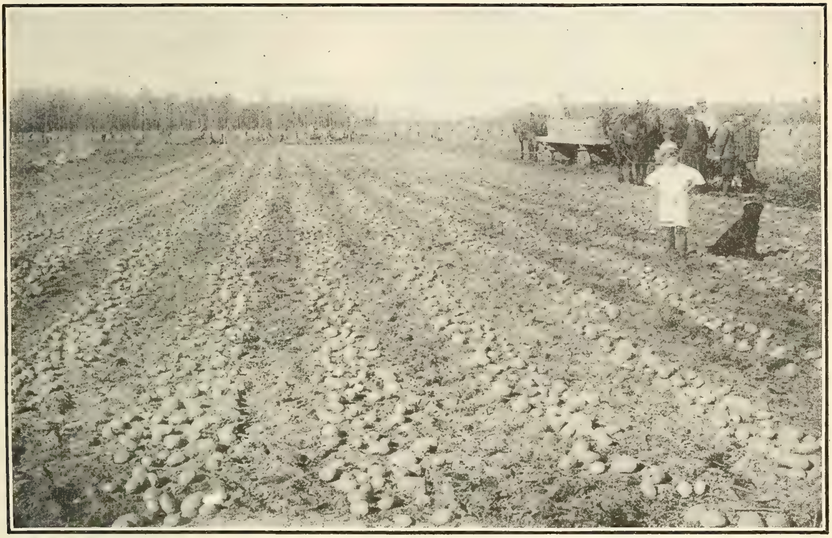

FIG. 10.—Potatoes on cut-over land. A moderate acreage of potatoes is generally a satisfactory cash crop.

CORN.

Early varieties of corn yield well in the southern part of this district and make good silage in a considerable portion of the area. Varieties especially adapted to the various parts of the district have been developed by the State experiment stations and by the local substations. In many parts of the district the value of a silo to a farm depends largely upon the number of cows kept and the success with which corn can be grown on that farm during a series of years. Root crops are used as a substitute for silage on many of the farms studied.

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[1] Wisconsin Experiment Station Bulletin No. 260, "First Aid to the Settler."

CLOVER.

Clover does exceptionally well in practically all parts of this region. Good yields are ordinarily secured without the aid of artificial inoculation or lime. Clover or clover and timothy are the most popular hay crops grown in this section. Medium red clover yields two crops in one season. The first crop is cut for hay and the second either for hay or for seed.[1] Two tons of hay from the first cutting and one from the second is a common yield, and it is not at all uncommon for clover seed to yield two bushels per acre. The clover-seed crop is somewhat uncertain, but in case it does not promise a fair yield of seed, by careful observation the farmer can usually determine this in time to cut the crop for hay.

ALFALFA.

Alfalfa can be grown successfully in nearly all parts of the region, but certain requirements are usually essential. Drainage, manure, a deep, compact, clean seed bed, lime, inoculation, and good seed insure a stand of alfalfa on the average soil of this district in any ordinary year. Alfalfa yields more hay per acre than clover, but it does not fit so well into existing rotations.

SWEET CLOVER.

Sweet clover is still in the experimental stage in this region, but is yielding satisfactory returns on a few farms. Soil preparation for sweet clover is about the same as for alfalfa. For hay and pasture it is less palatable than alfalfa. It seeds heavily, and the high price of the seed makes it a good cash crop. Sweet clover inoculates and in other ways prepares the soil for alfalfa.

HAIRY VETCH.

Hairy vetch is still in the experimental stage in this district. It is usually grown with winter rye. When sown late in the fall it sometimes winter-kills badly, but a good stand yields well and the seed usually sells at a high price. The crop is grown for seed, for hay, and for soil improvement. The common fanning mill does not separate vetch seed from rye, but there is a gravity spiral machine now on the market that makes a very complete separation.

CASH CROPS.

The following are good cash crops for this district: Potatoes for seed or market, hay, clover seed, peas, beans, hairy vetch, seed corn, rye, wheat, barley, and buckwheat. Limited amounts of small fruits and vegetables may be grown profitably where satisfactory markets are available. Of these, potatoes are most commonly grown as a cash crop. This is perhaps as it should be, because while their heavy yield uses much plant food, and they vary greatly in price, they are a comparatively certain crop and the yield in this section is generally satisfactory. In selling the seed of the legumes enumerated above, and of seed corn, soil fertility is usually sold at so high a price that the practice can safely be recommended. The selling of rye, wheat, and buckwheat on the general market is a practice, however, that should not be long continued without considering its effect on soil fertility. Hay is an important cash crop in certain sections of the region. While the practice of selling hay is undoubtedly yielding fair returns on many fertile farms in the cut-over district, here also care should be taken to see that the question of soil fertility is not being overlooked in the desire to increase present income.

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[1] U. S. Department of Agriculture Farmers' Bulletin No. 323, "Clover Farming on the Sandy Jack Pine Lands of the North."

EFFICIENCY AND DISTRIBUTION OF LABOR.

The rapid development of this northern country requires much heavy work. As farms become more improved the efficiency of field labor will increase. The labor on crops is now at a disadvantage on account of stumps and small irregular fields. In clearing land, horses and dynamite should take the place of man labor wherever practicable. One very efficient farmer, who has cleared quite a large Wisconsin farm, remarked: "In clearing land I do nothing I can make my horses do, and I make my horses do nothing that nature, if left to herself for a year or two, will do."

On a majority of the farms there is so little land under cultivation that the question of seasonable distribution of the labor among the various farm enterprises is still of minor importance. The opportunity to work in the woods for wages and to clear land on the home farm will for some time to come offer ample opportunity in the way of work for both men and horses at all periods of the year. Such work as the handling of timber and the clearing of land is very difficult and the pay comparatively small, yet when this work is done for wages it furnishes a living to the new settler until he gets enough land cleared to support his family from the income of the farm.

HOME AND FARM SUPPLIES.

A study of the farms of this district emphasizes the importance of producing home supplies. Vegetables and small fruit for home use can be, and in most cases are, produced in abundance. Close to the cities and larger villages some income may be secured from the sale of such crops, but generally it pays to produce only as much of these as can be used at home. The typical farm in this district furnishes milk, butter, eggs, meat, vegetables, and small fruit for home use and sells one or more of these products. On nearly every farm there is an abundance of firewood and plenty of good timber for fence posts. Lumber, stone, sand, and gravel needed in the construction of farm buildings can usually be secured on the farm or in the immediate vicinity. As a rule the farmers of this district are very quick to recognize the advantages to be secured by reducing the living and farm expenses to the minimum.

COMMUNITY BREEDERS' ASSOCIATIONS.

More and better live stock is needed on the farms of this district. There are already a number of wide-awake community live-stock organizations. They are accomplishing much that would be impossible to individuals working alone. Cooperative ownership of sires makes it possible to secure animals of a quality far beyond the reach of the individual farmer. More economical advertising, cooperative buying and selling, prevention and eradication of animal diseases, and the raising of standards due to education and competition, are a few of the advantages to be secured through community breeders' organizations. To improve the dairy herds of this district more cow-testing associations are greatly needed. A community desiring to take up work along any of these lines should communicate with the State agricultural colleges, with one of the substations within the district, or with the local county agricultural agent.

SELECTING A FARM.

Great care should be taken in selecting a farm in the cut-over district. The price of unimproved land, from which most of the valuable timber has been cut, usually varies from $5 to $25 per acre, depending on quality of soil, topography, and location. Improved farms, including buildings, are ordinarily held at prices ranging from $25 to $100 per acre. The range in price between the most desirable and the least desirable undeveloped agricultural land is now a matter of only a few dollars. When the region becomes thickly settled and these lands are improved, the difference in value per acre will undoubtedly be much greater than the present difference in price. During this period the better soils should also yield larger net profits per acre. The prospective purchaser of farm land will, therefore, be amply repaid for time and expense of making careful investigation of soil, topography, drainage, water supply, amount of salable timber, cost of clearing, markets, schools, and social conditions. He should reserve a part of his capital to develop the farm and to support his family until he can get a fair acreage under cultivation.

Before buying land careful examination should be made of both the soil and subsoil.[1] Soil fertility is purchased at less cost in the form of rich soil than in the form of commercial fertilizers. For most crops medium loam soils are best. Heavy soils are especially adapted to the production of hay. A clay subsoil, if not so compact as to interfere with drainage, is very desirable.

Of all the items to be considered from the business point of view, in selecting undeveloped land in this region, probably the one least likely to receive proper attention is the labor involved in clearing the land of stones and stumps. The expense of removing white pine stumps with dynamite or stump pullers should be carefully estimated for all parts of the farm before actually making the purchase. The cost of bringing pine land under successful cultivation ranges from $30 to $60 per acre, while about one-half that amount should pay for clearing hardwood land of the same quality.

GENERAL SUGGESTIONS.

1. It is possible, but not easy, to start farming here with very little capital. The total capital of the average farm studied is $6,856 and the average family income only $559. This is little enough on which to live, even when none of it has to be used to pay interest.
2. Select a farm well located with reference to markets and schools. Select a soil well adapted to the desired type of farming.
3. Buy good land. It is cheaper in the long run than poor land.
4. Do not pay too much for the farm. Remember you really get nothing for your work until interest is made on total investment.
5. Avoid the burden of too much undeveloped land, and, if possible, make every acre pay its way.
6. Enlarge the cleared area as rapidly as practicable. Be sure that the quality of land justifies the expense of clearing.
7. Use good bulls from high producing dams.
8. Plant good seed. It costs little more than poor seed and yields greater profits.
9. Grow clover, alfalfa, and other legumes. These crops furnish excellent feed and improve the soil.
10. The farm should furnish home supplies such as vegetables, small fruits, eggs, meat, and milk.
11. Keep horses busy at profitable work as many days in the year as possible.
12. Do not waste family labor on unprofitable work just because such labor is cheap.
13. Keep posted on market prices and grades. Prepare products according to these standards. Work for the advancement of the

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[1] Soil maps of many parts of the district can be obtained from the U. S. Department of Agriculture and from the State experiment stations.

community. Help improve roads, schools, and markets. This will actually pay in dollars.

14. The agricultural papers in each of these three States are giving special attention to the development of this region. Many of their articles are direct from the farm, written by practical men, and are well worth reading.

15. Get in touch with the State experiment station, local substations, and the county agricultural agents; they can help. Secure lists of the bulletins published by the State experiment station and by the United States Department of Agriculture. Ask for such bulletins as you think may assist you in your work.

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